

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Withdrawn) A fuel injection device comprising:

a valve body having an inner wall in which a fuel passage is formed, the inner wall being provided with a valve seat;

a valve member having a valve coming in contact with the valve seat, the valve member being operative to close the fuel passage when the valve is seated on the valve seat and to open the fuel passage when the valve leaves the valve seat; and

an injection bore plate mounted on the valve body downstream the valve seat, the injection bore plate being provided with a plurality of injection bores through which an end surface thereof on a side of the valve seat communicates with an end surface thereof on a side opposite to the valve seat and with a step formed on the end surface thereof on a side of the valve seat,

wherein the step serves not only to guide fuel so as to flow into the injection bores from the fuel passage but also to strengthen stream of the fuel in a given direction before the fuel enters the injection bores.

2. (Withdrawn) The fuel injection device according to claim 1, wherein the injection bore plate is provided at the end surface thereof on a side of the valve seat with a first surface to which inlets of the injection bores are opened and with a second surface positioned on a side of the valve seat with respect to the first surface so that the step is formed between the first and second surfaces, whereby the step causes the fuel to flow into the injection bores through the first surface without passing through the second surface.

3. (Withdrawn) The fuel injection device according to claim 2, wherein, after the fuel enters the first surface and hits against the step, the fuel flows into the injection bores.

4. (Withdrawn) The fuel injection device according to claim 2, wherein, after the fuel flowing on the first surface constitutes two streams in opposite directions along the step and the two streams hit against each other, the fuel flows into the injection bores.

5. (Withdrawn) The fuel injection device according to claim 3, wherein the injection bore plate has two injection bores and, further, wherein, after the fuel flows on the first surface toward the step along a hypothetical line from any point of which axial centers of the two injection bores are at equal distances and hits against the step, a stream the fuel is turned back and split into two streams each oriented toward each of the two injection bores.

6. (Withdrawn) The fuel injection device according to claim 5, wherein a distance from each axial center of the two injection bores to the hypothetical line is larger than a distance from the each axial center of the two injection bores to the step.

7. (Withdrawn) The fuel injection device according to claim 4, wherein the injection bore plate has two injection bores and, further, wherein the two streams are constituted by the fuel entering radially opposite ends of the first surface and flowing radially inward along the step so that, after the two streams hit against each other, each of the two streams is oriented toward each of the two injection bores.

8. (Withdrawn) The fuel injection device according to claim 4, wherein a distance between axial centers of the two injection bores is shorter than a distance from the each axial center of the two injection bores to the step.

9. (Withdrawn) The fuel injection device according to claim 5, wherein the hypothetical line extends substantially perpendicularly to the step.

10. (Withdrawn) The fuel injection device according to claim 2, wherein the injection bore plate is provided with a plurality pieces of the first surfaces each having two injection bores and with a plurality pieces of the second surfaces, whereby the plurality of first and second surfaces are alternately arranged circumferentially so that the step is formed between each of the plurality of first surfaces and each of the plurality of second surfaces.

11. (Withdrawn) The fuel injection device according to claim 4, wherein a distance of the first surface in a first radial direction is shorter than a distance of the first surface in a second radial direction perpendicular to the first radial direction, two pieces of second surfaces are formed at opposite end of the first surface in the first radial direction and the first surface has four injection bores.

12. (Withdrawn) The fuel injection device according to claim 11, wherein a distance between axial centers of the adjacent injection bores is larger than a distance between each axial center of the injection bores and each of the steps adjacent thereto.

13. (Withdrawn) The fuel injection device according to claim 4, wherein the injection bore plate has a plurality of first surfaces circumferentially arranged so as to abut on one another in a vicinity of an axial center thereof, each of the first surfaces has a single piece of the injection bores and a plurality of second surfaces circumferentially arranged and each being sandwiched between the adjacent two of the first surfaces so that the steps are formed on both sides of each of the first surfaces.

14. (Withdrawn) The fuel injection device according to claim 13, wherein, in each of the first surfaces, a distance between an axial center of the injection bore and one of the steps is different from a distance between the axial center of the injection bore and the other of the steps.

15. (Withdrawn) The fuel injection device according to claim 2, further comprising:

a fuel inflow control member disposed in the fuel passage on a side of the valve seat with respect to the injection bore plate for allowing fuel from the fuel passage to flow into the first surface.

16. (Currently amended) A fuel injection device comprising:

a valve body having an inner wall in which a fuel passage is formed, the inner wall being provided with a valve seat;

a valve member having a valve coming in contact with the valve seat, the valve member being operative to close the fuel passage when the valve is seated on the valve seat and to open the fuel passage when the valve leaves the valve seat; and

an injection bore member mounted on an end of the valve body downstream the valve seat, ~~wherein the injection bore member being provided in a vicinity of a radial center thereof with a plurality of injection bores and with a guide passage including a step for causing fuel from the fuel passage to flow in at longitudinal opposite ends thereof and to flow along the step toward a center thereof to which inlets of the injection bores are opened~~

the injection bore member is composed of first, second, and third plates and an injection bore plate, which are stacked on top of one another,

a space is formed between a bottom of the valve body and the second plate, fuel being supplied into the space when the fuel passage is opened,

a pair of first openings is formed in the second plate, each of the openings of said pair being formed as a through-hole penetrating the second plate in a thickness direction thereof, one end of the through-hole being communicated with the space,

a control opening is formed between the second plate and the injection bore plate to form a guide passage, which has a center opening and a pair of outer openings,

the outer openings are defined at outer sides of the center opening and communicated with the center opening,

the other ends of the through-holes are communicated with respective outer openings, so that the fuel flows from the space into the outer openings through the respective through-holes,

multiple injection bores are formed in the injection bore plate, an inside end of each injection bore being opened to the center opening formed between the second plate and the injection bore plate, and

each of the through-holes is arranged in the second plate at such a position, which is on an outer side of the injection bores in a radial direction, so that the fuel supplied into the outer openings flows toward the injection bores in radial and inward directions from each of the outer openings.

17. (Currently amended) The fuel injection device according to claim 16, wherein

each of the outer openings of the guide passage has a reducing area portion whose area is gradually smaller toward the center thereof opening, and

[[a]]the center opening has an enlarging area portion which is connected to an end of the reducing area portion on a side of the center thereof opening and whose area is gradually larger toward the center thereof.

Claims 18 – 22. (Canceled).

23. (Withdrawn) The fuel injection device according to claim 1, wherein each inner diameter of the injection bores is substantially uniform in thickness direction thereof.

24. (New) The fuel injection device according to claim 16, wherein the outer openings are defined on diametrically opposite sides of the center opening.

25. (New) The fuel injection device according to claim 16, wherein each of the outer openings is near fan-shaped having an outwardly flaring portion extending away from said center opening, and wherein said center opening is generally octagonal shaped.

26. (New) A fuel injection device comprising:

a valve body having an inner wall in which a fuel passage is formed, the inner wall being provided with a valve seat;

a valve member having a valve coming in contact with the valve seat, the valve member being operative to close the fuel passage when the valve is seated on the valve seat and to open the fuel passage when the valve leaves the valve seat; and

an injection bore member mounted on an end of the valve body downstream of the valve seat,

wherein the injection bore member comprises:

a space operatively communicated with the fuel passage, so that fuel is supplied into the space when the fuel passage is opened;

a guide passage having a center opening and a pair of outer openings, the center opening being arranged at a center of the injection bore member and the outer openings being connected to the center opening and arranged at radial outer sides of the center opening;

a pair of through-holes for communicating the space with the respective outer openings of the guide passage, so that the fuel flows from the space into the outer openings of the guide passage through the respective through-holes; and

multiple injection bores, an inside end of each injection bore being opened to the center opening of the guide passage,

wherein each of the through-holes is arranged at such a position, which is on an outer side of the injection bores in a radial direction, so that the fuel supplied into the outer openings flows toward the injection bores in radial and inward directions from each of the outer openings.